APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/732,250	12/07/2000	Vamsi Krishna Sangavarapu	JP920000280US1	9490

7590	10/27/2003

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EXAMINER
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ART UNIT	PAPER NUMBER
2124	

DATE MAILED: 10/27/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**.　　2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-18_ is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-18_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _1/8/02_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

　　If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All b)☐ Some * c)☐ None of:

　　　　1.☐ Certified copies of the priority documents have been received.

　　　　2.☐ Certified copies of the priority documents have been received in Application No. _____ .

　　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
　　　　　　application from the International Bureau (PCT Rule 17.2(a)).
　　* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

　　a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4)☐ Interview Summary (PTO-413) Paper No(s). _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: .

DETAILED ACTION

1. The priority date for the application is 12/7/2000.

2. This action is responding to application papers dated 12/7/2000 and 1/8/2002.

3. Claims 1-18 are pending.

Drawings

4.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5)

because they include the following reference sign(s) not mentioned in the description:

14, 126, and 148 in FIG 1.   A proposed drawing correction, corrected drawings, or

amendment to the specification to add the reference sign(s) in the description, are

required in reply to the Office action to avoid abandonment of the application. The

objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

6.   Claim 7 recites the limitation "said computer software" in line 3. There is

insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Alverson et al. (US 6,480,818), and further in view of Kakivaya et al. (US 6,546, 443).

In regard to claims 1, 7, and 13, Alverson et al. disclose debugging techniques

using breakpoints in a multithreaded environment where multiple threads can be

executed simultaneously. Alverson et al. show a method of checking a breakpoint data

structure to determine if a breakpoint known to a debugging process is at an address

where a breakpoint fired (see col 11 lines 31-50, "if the nub needs to access various

data structures ... ensuring that the data structures are in the proper state", and col 13

lines 28-49, "The breakpoint handler then determines ... and retrieve the information

specific to this breakpoint"). Also, see col 21 lines 50-67. Alverson et al. also show the

method of verifying if a breakpoint condition exists at the address where the breakpoint

fired. See col 14 lines 39-64, "set the conditional breakpoints ... to the debugger ... if

the specified condition is true at the time that the breakpoint is hit...having the nub save

the information about the condition." See also col 21 lines 50-65 and col 22 lines 1-65.

However, Alverson et al. do not specifically show the zombie global breakpoints

appearing in the context of a race condition between simultaneous breakpoint hit in one

thread or processor and breakpoint removal of the same breakpoint in another thread or

processor.

Kakivaya et al. (col 3 lines 45-50, col 16 lines 30-60, col 19 lines 50-65 and col

20 lines 1-16) inherently show the method of preventing a race condition in an

analogous art for the purpose of avoiding lock corruption or inconsistency where more than one processor/threads both hit breakpoints in the context of debugging process. The processor has hit a breakpoint entering the waiting state while another processor is in the debugging state without having been stopped by the other processor. When the breakpoint handler attempts to process the breakpoint hit, the breakpoint has been already processed and removed by the debugger leaving the system in an inconsistent and corrupted state. It is, therefore, obvious that neither a known breakpoint nor a breakpoint condition can be determined at said address at this time. It is inherent that the breakpoint handler concludes the breakpoint condition is false, according to Alverson et al. (col 14 lines 40-64), meaning that there is no breakpoint hit to be processed in the waiting state by the debugger and therefore creating the Zombie breakpoint situation, according to Kakivaya et al (16 lines 30-59). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to incorporate the teaching of Kakivaya et al. to the method of Alverson et al. for the purpose to avoid lock corruption or inconsistent system behavior. The modification would be obvious because a person of ordinary skill in the art would have been motivated to include the method of detecting zombie breakpoint in the context of the race condition so that unintended non-determinism resulting in erroneous program behavior that is hard to reproduce and debug can be avoided.

-- In regard to claims 2, 8, and 14, Alverson et al. show a special breakpoint instruction at said address, being the exception location. See col 1 lines 61-67, col 6 lines 59-67, col 7 lines 1-11, lines 52-67, col 8 lines 1-25, and col 10 lines 44-53.

-- In regard to claims 3, 9, and 15, Alverson et al. show an illegal breakpoint instruction.   See col 16 lines 22-40.

-- In regard to claims 4,10, and 16, Alverson et al. show special debug register. See col 2 lines 66-67, col 3 lines 1-33, and col 5 lines 11-35.

-- In regard to claims 5, 11, and 17, Alverson et al. show physical settings for causing a breakpoint exception at a particular location are detectable from a breakpoint handler.   See col 7 lines 51-67 and col 8 lines 1-25, col 10 lines 31-43, and col 13 lines 28-49.

-- In regard to claims 6, 12, and 18, Alverson et al. show breakpoint removal logic. Alverson et al. disclose a method to remove a breakpoint by permanently replacing the breakpoint instruction with the previously replaced instruction. It is, therefore, obvious that the breakpoint instruction would be moved before the removal of a breakpoint.   See col 16 lines 41-61, col 20 lines 11-38, and col 7 lines 12- 23 and lines 35-67.

9.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Insun Kang whose telephone number is 703-305-6465. The examiner can normally be reached on M-F 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on 703-305-9662. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is 703-305-

0000.

IK

09/30/2003

JOHN CHAVIS
PATENT EXAMINER
ART UNIT 2124